

Io: Near-Infrared Absorptions Not Attributable to SO₂

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The Near-Infrared Mapping Spectrometer (NIMS) onboard the Galileo spacecraft imaged the leading side of Jupiter's satellite Io at full spectral resolution and with triple Nyquist spatial sampling during the fifteenth orbital encounter (E15). New despiking and "dejittering" algorithms have been applied to this high S/N observation (15INHRSPEC01A). Spectral absorption features not attributable to SO₂ are found between 3.0-3.4 microns and near 4.65 microns. The patterns of the spatial distributions of both absorbers differ from that of the omnipresent SO₂. The broad 3.0-3.4 micron absorption is most pronounced in polar regions. Preliminary work suggests that the 4.65 micron feature may be associated with an unidentified sulfate mineral, while the 3.0-3.4 micron feature may result from the presence of more than one absorbing material. Hydrogen-bearing species are likely candidates. For example, H₂O ice provides a good match for the absorption near 3.2 microns, but the absorption is shifted to wavelengths longer than that in pure H₂O ice. If only one absorber is present, then hydrogen bonding of small numbers of H₂O molecules could perhaps account for the shift. The absorption is weak; if H₂O related, optical path lengths of a fraction of a micron are indicated.

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